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10/566,207	01/27/2006	An-Pang Tsai	053484	1015

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EXAMINER	
VAN OUDENAREN, SARAH A	
ART UNIT	PAPER NUMBER
4162	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,207	TSAI ET AL.	
	Examiner	Art Unit	
	SARAH VAN OUDENAREN	4162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☒ Claim(s) *1,2,7 and 8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/27/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 1, 2, 7, and 8 are objected to because of the following informalities: use of parentheses.

Regarding claim 1, the limitation (where y is in the range…) is recited in lines 9-12.

Regarding claim 2, the limitation (0<x≤1.0) is recited in line 5.

Regarding claim 7, the limitation (where y is in the range…) is recited in lines 5-8.

Regarding claim 8, the limitation (0<x≤1.0) is recited in line 5.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshimura et al (Quasicrystal Application on Catalyst). Yoshimura teaches a catalyst composition for the steam reforming of methanol. It is taught that an alloy of stable quasicrystal $Al_{63}Cu_{25}TM_{12}$, where TM is a transition metal, is crushed and leached with an aqueous alkaline solution (page 452, paragraph 3, lines 1-20). The alloy has an aluminum oxide passive layer (page 451, paragraph 3, lines 16-18). The alloy particles also have copper and copper oxide particles dispersed throughout the surface (page 452, paragraph 3, lines 15-18). Yoshimura does not teach a TM oxide being in the surface layer. It would

have been obvious to one of ordinary skill in the art at the time of the invention to assume that a TM oxide would remain in the surface layer as the original alloy comprises a TM, and the Cu and Al are oxidizing so it would be obvious that the TM would oxidize as well.

It is noted that, "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious different between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

With the significant amount of product by process in the claim limitations of instant claim 1, it is noted by examiner that the product of claim one is a catalyst comprising Al alloy particles having an oxide surface layer containing fine copper oxide particles where the surface layer is composed of aluminum oxide, copper oxide, and a TM oxide.

Regarding claim 2, Yoshimura teaches that the surface layer comprises CuO ((page 452, paragraph 3, lines 15-18).

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious different between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

Regarding claim 3, Yoshimura teaches that the aluminum oxide layer is formed at the surface of the alloy (page 451, paragraph 2, lines 15-17). Yoshimura also teaches that the surface comprises Cu and copper oxide particles (page 452, paragraph 3, lines 15-18). Although Yoshimura does not explicitly teach the formation of the copper oxide and the TM oxide at the interface of the Al alloy particles, it would have been obvious to one of ordinary skill in the art at the time of the invention to assume that the formation would take place at the surface just as the aluminum oxide formation does. It also would have been obvious to one of ordinary skill in the art at the time of the invention to assume that TM oxide would remain in the surface layer as the original alloy comprises a TM and the Cu and Al are oxidizing so it would be obvious that the TM would oxidize as well.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious different between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

Regarding claim 4, Yoshimura teaches that TM can be Fe, Ru, and Os (page 452, paragraph 2, lines 1-3).

Regarding claim 5, Yoshimura teaches the use of an alloy having Pd and Mn (page 451, paragraph 3, lines 10-20). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize these elements with the Al-Cu alloy of Yoshimura's invention as Pd is taught by Yoshimura to be an element known in the art to be highly active toward methanol decomposition, but not cost effective (page 451, paragraph 2).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshimura et al (Quasicrystal Application on Catalyst) as applied to claim 1 above, and further in view of

Yamasaki et al (Oxidation Behavior of Quasicrystalline $Al_{63}Cu_{25}Fe_{12}$). Yoshimura teaches a catalyst composition for the steam reforming of methanol, as discussed above. However Yoshimura does not explicitly teach the use of copper nanoparticles. Yamasaki teaches a quasicrystal catalyst prepared from $Al_{63}Cu_{25}Fe_{12}$ having a surface oxide layer comprising aluminum oxide and copper particles at the surface (page 473, paragraph 1). Yamasaki also discusses the use of nanoparticles as an effective tool in accelerating the oxidation of an alloy with protective oxide surface layer, and forming a fine-grained oxide structure (page 473, paragraph 2). These particles are taught by Yamasaki to have a diameter of 5μm or less (page 474, paragraph 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the nanoparticles of Yamasaki in the catalyst of Yoshimura in the form of copper nanoparticles in order to increase the oxidation of the alloy with the protective surface oxide layer and to form a fine-grained structure.

Claims 7, 8, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshimura et al (Quasicrystal Application on Catalyst). Yoshimura teaches a catalyst used for steam reforming of methanol. The method of making is taught to comprise the steps of crushing an Al alloy having a crystalline phase (page 451, paragraph 2) where the formula of the alloy is $Al_{63}Cu_{25}TM_{12}$, where TM is a transition metal (page 452, paragraph 2, line 1). The crushed alloy particles were then leaches with an aqueous alkaline solution which formed an aluminum oxide layer on the surface of the materials (page 452, paragraph 2). The surface taught is considered to have Cu and CuO

particles throughout the surface (page 452, paragraph 3, lines 15-18). Yoshimura does not teach a TM oxide being in the surface layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to assume that TM oxide would remain in the surface layer as the original alloy comprises a TM and the Cu and Al are oxidizing so it would be obvious that the TM would oxidize as well. Yoshimura does not teach a heat treatment to oxidize the Cu to CuO, however there is CuO present. One of ordinary skill at the time of the invention would find it obvious to use a heat treatment in an oxidizing atmosphere to produce CuO from Cu particles.

Regarding claim 8, Yoshimura teaches that the surface layer comprises CuO ((page 452, paragraph 3, lines 15-18).

Regarding claim 11, Yoshimura teaches that approximately 15% of Al in the alloy is leaches out (page 452, paragraph 3, lines 10-11).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshimura et al (Quasicrystal Application on Catalyst) as applied to claim 7 above, and further in view of Kazuhito et al (JP 03-238049). Yoshimura teaches a method or preparing catalyst composition for the steam reforming of methanol, as discussed above. Yoshimura does not explicitly teach the temperature range of the aqueous alkaline solution within the range of the instant claim. Kazuhito teaches a methanol reforming catalyst consisting of Cu, Zn, and Al in an alkali solution of 30-60°C in order to prepare the catalyst (see abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the temperature range of Kazuhito with the catalyst preparation of

Yoshimura in order to arrive at the product of Yoshimura as it is shown to be an effective temperature for preparation of the catalyst.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshimura et al (Quasicrystal Application on Catalyst) as applied to claim 7 above, and further in view of Moriga et al (JP 402233501A). Yoshimura teaches a method or preparing catalyst composition for the steam reforming of methanol, as discussed above. Yoshimura teaches the aqueous alkaline solution being NaOH (page 452, paragraph 3, lines 3-5), however, Yoshimura does not teach the percentage of NaOH to meet that of the instant claim. Moriga teaches an alloy which is converted to a catalyst for reforming methanol comprising Al, Cu, Zn or Cr. Moriga teaches leaching the alloy in an aqueous alkaline solution of 1-40% NaOH in order to dissolve the Al from the surface of the alloy (see abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the percentage of NaOH of Moriga with the catalyst preparation of Yoshimura in order to dissolve the Al from the surface of the alloy during leaching.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshimura et al (Quasicrystal Application on Catalyst) as applied to claims 7 and 8 above, and further in view of Yamasaki et al (Oxidation Behavior of Quasicrystalline $Al_{63}Cu_{25}Fe_{12}$). Yoshimura teaches a method or preparing catalyst composition for the steam reforming of methanol, as discussed above. However Yoshimura does not explicitly teach the use of copper nanoparticles. Yamasaki teaches a quasicrystal catalyst prepared from

$Al_{63}Cu_{25}Fe_{12}$ having a surface oxide layer comprising aluminum oxide and copper particles at the surface (page 473, paragraph 1). Yamasaki also discusses the use of nanoparticles as an effective tool in accelerating the oxidation of an alloy with protective oxide surface layer, and forming a fine-grained oxide structure (page 473, paragraph 2). These particles are taught by Yamasaki to have a diameter of 5μm or less (page 474, paragraph 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the nanoparticles of Yamasaki in the catalyst preparation of Yoshimura in the form of copper nanoparticles in order to increase the oxidation of the alloy with the protective surface oxide layer and to form a fine-grained structure.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SARAH VAN OUDENAREN whose telephone number is (571)270-5838. The examiner can normally be reached on Monday-Thursday, 9:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SVO

/Jennifer McNeil/

Supervisory Patent Examiner, Art Unit 4162